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In Memoriam: Bernard Gendron,1966–2022

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On July 17, 2022, our friend and colleague Bernard Gendron passed away, after an unforgiving illness. Bernard was a professor of operations research in the Département d'informatique et de recherche opérationnelle (DIRO—Department of Computer Science and Operations Research) of the Université de Montréal, a senior member of CIRRELT (Interuniversity Research Centre on Enterprise Networks, Logistics, and Transportation), and a long-time active member of the INFORMS Transportation Science and Logistics Society.

Bernard started displaying his innate talent for research and making important contributions to operations research and transportation science while working toward his master's degree at DIRO. His master's thesis addressed a challenging, recently defined logistics problem through network design modelling and a parallel exact enumerative algorithm. In this, Bernard was an important member of the team that started the Montreal research work on parallel optimization, and one of the pioneers developing such methodology to address transportation and logistics planning challenges. The Canadian Operational Research Society (CORS) acknowledged the quality of the research, and Bernard's writing skills, by awarding him the First Prize of the student article competition of 1992.

Bernard followed with an exceptional PhD dissertation, still at DIRO, on multicommodity capacitated fixed charge network design applied to planning transportation and logistics systems. The thesis included several important contributions to the understanding, modelling, and solution of network design problems, as well as to the development of parallel optimization, for which he received the 1995 Best Dissertation Award of the Transportation Science Section of INFORMS. Impressed by the quality of his work, DIRO hired Bernard as a tenure-track faculty member, even before his dissertation defense.

Bernard Gendron. Photo taken at the NOW 2015 Conference, held in La Rochelle, France, May 18–21, 2015.

In the years that followed, Bernard pursued a very active academic career combining top-level research with teaching and transfer activities. In these, he showed that he was a true great operations research scientist, harmoniously blending applications and methodology to push the science envelope and address relevant and challenging problems of substantial industrial and societal interest. From the very beginning of his research work, Bernard was highly motivated by such applications, particularly in transportation and logistics (e.g., system and service network design for freight carriers and distribution networks, location of facilities, and forestry problems), scheduling of tasks and personnel, and fixed and wireless telecommunication network planning and management. As it is typical of the field, addressing practical problems led him to study and develop the relevant methodological part of operations research and mathematical programming, focusing on combinatorial optimization and integer programming, in particular graph theory, location, network design, and routing.

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To address the highly challenging problems raised by the generic and applied models he studied, Bernard left no stone unturned and explored a wide range of mathematical optimization methodologies. He cunningly employed existing techniques and proposed significant methodological advances in such diverse fields as Lagrangian relaxation, column generation, Benders' decomposition, logic-based constraint programming, cutting planes and enumerative (branch-and-bound-and-cut) algorithms, and meta- and math-heuristic solution methods. Since the early days of his career, he was a pioneer and an avid proponent of parallel optimization.

In his applied and methodological work alike, Bernard deployed his creativity and considerable knowledge to both modelling and algorithmic development. For every application he addressed, Bernard searched for the mathematical formulation that would simultaneously capture the essence of the problem at hand and be amenable to an efficient solution method, in order to yield the numerical results required by the application. To reach this goal, Bernard applied significant understanding and tools developed studying the more abstract, generic problem classes in combinatorial optimization, for example, reformulation techniques and polyhedral analysis.

Bernard had both a passion and a special knack for continuously revisiting so-called "old" models and problems, and finding new and original reformulations and solution approaches. He never stopped studying general models with many practical applications and proposing novel ways of viewing, decomposing, and approaching them. The many variants of the multicommodity network flow and design problems formed one of the fields of work about which he was most passionate, yielding some of his more important and long-lasting contributions to science and operations research. The chapter "Exact Methods for Fixed-Cost Network Design" in the book *Network Design with Applications to Transportation and Logistics*, which he recently coedited, synthesizes his immense heritage in the field (Crainic and Gendron 2021). This unabated curiosity is the hallmark of a truly exceptional researcher, such as he was.

A large part of Bernard's work was performed in the context of very lively international collaborations with colleagues from top institutions and companies from around the world. These include the Massachusetts Institute of Technology in Boston, the Swiss Federal Institute of Technology in Lausanne, ILOG in Paris, the École Centrale de Lille, and the Universities of Pisa, Lisbon, Nice Sophia Antipolis, Clermont-Ferrand (Blaise-Pascal), Versailles, and Valenciennes, among others. These international collaborations also gave rise to his participation in specialized doctoral schools as both organizer and lecturer.

Bernard's talent as a researcher created many interesting opportunities. Among these, he held two important chairs: an industrial chair on data intelligence for logistics, supported by the company Purolator and the Natural Sciences and Engineering Research Council of Canada, and a chair on green technologies, funded by the government of Quebec, dealing with the transformations in the transportation sector.

Besides his primary interest in science and research, Bernard cared immensely for the scientific and academic community, both in Montreal and abroad. Over time, this led him to accept a number of duties and tasks in a variety of roles. In 2008, Bernard was selected to become the first director of CIRRELT, the Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation. Born from the merger of various research groups in five different universities, CIRRELT flourished under Bernard's skillful stewardship of eight years and became one of the leading research centers in logistics and transportation in the world. A few years later, Bernard was asked to become adjunct vice-rector of research, discovery, creation, and innovation of the Université de Montréal in 2021. Unfortunately, illness prevented him from accomplishing as much as he aimed for in that position.

Bernard displayed the same energy and gift for stewardship with respect to learned societies, which brought him great appreciation and respect in the community. He held many positions within CORS, from president of the Montreal section to council member to president (2004–2005). CORS recognized Bernard's outstanding contributions to Canadian operations research by bestowing on him three major distinctions: the Award of Merit (2010), the Service Award (2006), and the Practice Prize (2004).

Bernard was also deeply committed to the INFORMS community, in particular, those interested by transportation and logistics and the interplay between operations research developments and the performance of applications. He was thus first elected president of the Transportation Science Section of INFORMS (2001–2002, after serving as vice president, 2000–2001, and secretary–treasurer, 1998–2000), before becoming the first president of the Section on Transportation Science and Logistics (2002–2003).

Bernard was very active in scientific publishing. After serving as an associate editor of *INFOR* from 2004 to 2006, he was its editor-in-chief from 2006 to 2014. He had also been the area editor for "Combinatorial Optimization" of *RAIRO-Operations Research* since 2019, and a member of the editorial boards of *Constraint Programming Letters* and the *EURO Journal on Transportation and Logistics* since 2006 and 2012, respectively. Always at the forefront of transformations, he was also one of the founders and the section editor in "Computational aspects and applications" of the *Open Journal of Mathematical Optimization*, the first completely gold open access journal in the operations research area. Bernard was also involved in the organization of several conferences and workshops as a member of their organizing or

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scientific committees. These scientific events include, among others, the CORS/INFORMS International Meeting of 2009, the International Federation of Operational Research Societies Triennial Meeting of 2017, and several editions of the Odysseus, CPAIOR (Integration of Constraint Programming, Artificial Intelligence, and Operations Research), and Optimization Days conferences.

Throughout his career, Bernard was deeply committed to his students, both graduate and undergraduate. Bernard not only shared his knowledge, but also wanted to give them the opportunity to grow as scientists and human beings. Younger colleagues also recall his reassuring presence as a mentor and an example of a true academic.

All those who have known Bernard have a deep respect for his scientific abilities and his numerous professional accomplishments, but they especially dearly remember the man he was: warm, smiling, and with an incomparable laughter. His hardworking attitude never was disjoint from his heartfelt, true respect of others. Together with his renowned sense of humor, this made him a wonderful colleague, both to have full-night work stints with and to chat with about hockey or the history of Quebec over a beer. We will sorely miss him.

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